

# Alpine grasslands with dominant *Luzula alpinopilosa* in the Julian and Carnic Alps (NW Slovenia, NE Italy)

Igor Dakskobler<sup>1</sup> & Livio Poldini<sup>2</sup>

**Key words:** phytosociology, synsystematics, *Junco jacquini*-*Luzuletum alpinopilosae*, *Juncetea trifidi*, Julian Alps, Carnic Alps, Slovenia, Italy.

**Ključne besede:** fitocenologija, sinsistematika, *Junco jacquini*-*Luzuletum alpinopilosae*, *Juncetea trifidi*, Julijske Alpe, Karnijske Alpe, Slovenija, Italija.

## Abstract

We conducted a phytosociological study of alpine grasslands with dominant *Luzula alpinopilosa* in the Julian and Carnic Alps. Based on a comparison with similar communities elsewhere in the Alps we described a new association *Junco jacquini*-*Luzuletum alpinopilosae*, which we classify into the provisional alliance *Doronico glacialis*-*Juncion jacquini*, order *Festucetalia spadiceae* and class *Juncetea trifidi*. The new association characterises moist shady grasslands in gullies and on ledges on limestone admixed with marlstone and chert, in the elevation range between 2000 and 2500 m, where the snow cover persists for extended periods. We distinguish three subassociations: *-galietosum anisophyllae* (the most calcareous form), *-potentilletosum aureae* (typical form) and *-leucanthemopsietosum alpinae* (acidophilic form on Werfen sandstones in the Carnic Alps, which is the most similar to the stands of the association *Luzuletum alpinopilosae* from the Central Alps).

## Izvleček

Fitocenološko smo analizirali alpinska travišča v Julijskih in Karnijskih Alpah, v katerih prevladuje vrsta *Luzula alpinopilosa*. Na podlagi primerjave s podobnimi združbami drugod v Alpah smo opisali novo asociacijo *Junco jacquini*-*Luzuletum alpinopilosae*, ki jo uvrščamo v provizorno novo zvezo *Doronico glacialis*-*Juncion jacquini*, v red *Festucetalia spadiceae* in v razred *Juncetea trifidi*. Nova asociacija označuje vlažna osojna travišča v žlebovih in na policah na apnencu s primesjo laporovca in roženca, v višinskem pasu od 2000 m do 2500 m, kjer se dalj časa zadržuje sneg. Razlikujemo tri subasociacije: *-galietosum anisophyllae* (najbolj karbonatna oblika), *-potentilletosum aureae* (tipična oblika) in *-leucanthemopsietosum alpinae* (kisloljubna oblika na werfenskih peščenjakih v Karnijskih Alpah, ki je najbolj podobna sestojem asociacije *Luzuletum alpinopilosae* iz Centralnih Alp).

Received: 25. 4. 2018

Revision received: 31. 10. 2018

Accepted: 12. 11. 2018

*Dedicated to the late Professor Tone Wraber (1938–2010),  
on the occasion of his 80<sup>th</sup> birthday*

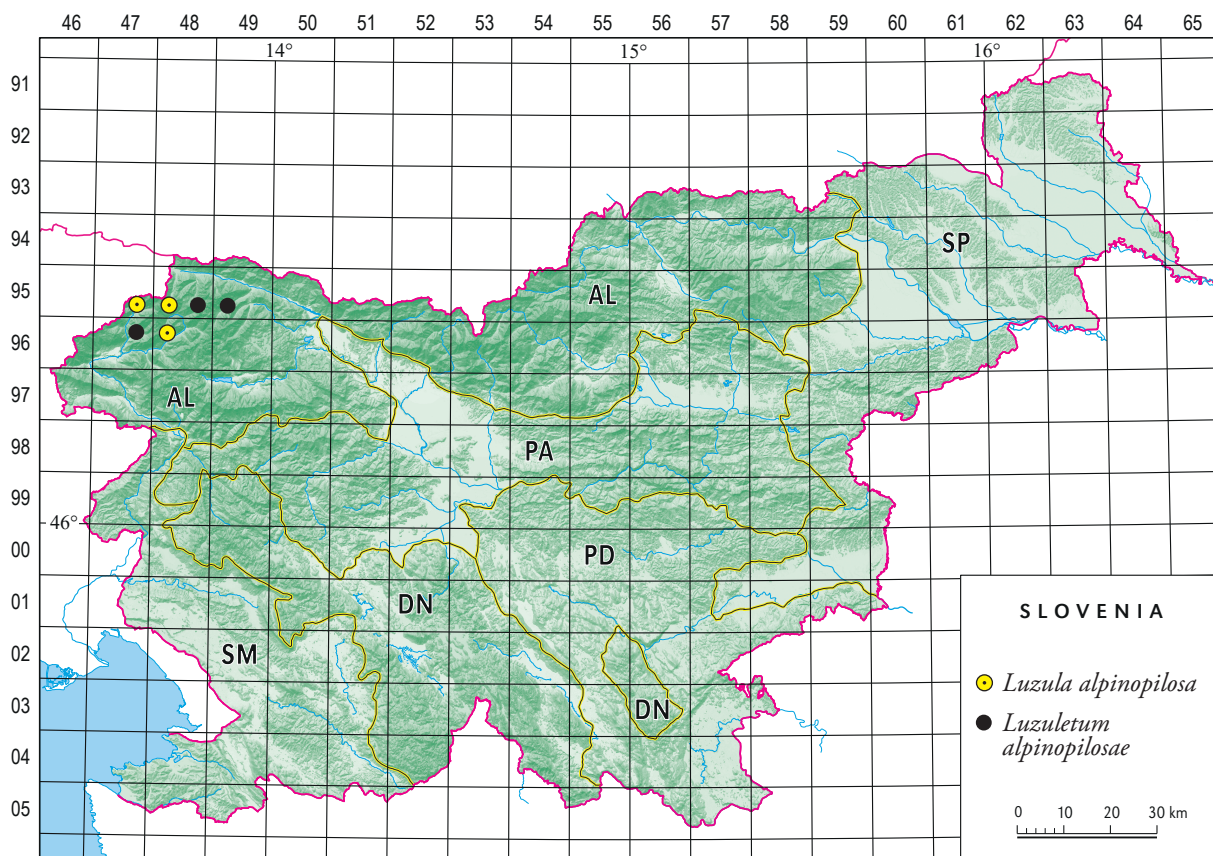
1 Scientific Research Centre of the Slovenian Academy of Sciences and Arts, Institute of Biology, Regional unit Tolmin, Brunov drevored 13, SI-5220 Tolmin, Slovenia. E-mail: Igor.Dakskobler@zrc-sazu.si.

2 Department of Life Sciences, University of Trieste, via L. Giorgieri, 5, I-34127 Trieste, Italy. E-mail: poldini@units.it

## Introduction

*Luzula alpinopilosa* is a southwestern-European montane species, a character species of the class *Salicetea herbaceae* (Aeschimann et al. 2004b: 754). In Slovenia it is distributed only in the Julian Alps (Figure 1), at the elevation range between 1695 m (Spodnji Lepoč above the Bala valley) and 2500 m (Mt. Mangart). It occurs mainly on shady, gentle to very steep alpine grasslands, in snow beds with dominating *Salix herbacea*, in tall herb communities, rarely also in alpine heaths. The parent material in these localities is usually mixed; limestone is admixed with marlstone, claystone or chert. So far, it has been recorded in the stands of associations *Salicetum herbaceae* s. lat., *Luzuletum alpinopilosae* s. lat. (= *Luzuletum spadiceae* s. lat.), *Caricetum ferrugineae* s. lat., *Aconito-Peucedanetum ostruthii*, *Homogyno alpinae-Vaccinietum gaultherioidis*, *Gentiano pumilae-Salicetum serpillifoliae*, *Salicetum retuso-reticulatae*, *Caricetum curvulae* s. lat., *Carici curvulae-Nardetum*, *Calamagrostietum villosae* nom. prov. (*Festuca nigrescens-Calamagrostis villosa* ass. prov.) – mostly unpublished rele-

vés by Tone Wraber and Igor Dakskobler in the FloVegSi database (Seliškar et al. 2003). Its occurrence in snow bed communities with *Salix herbacea* and an abundant moss layer is discussed in another article (Martinčič et al. 2019), whereas this paper focuses on the phytosociological analysis of alpine grasslands with dominating *Luzula alpinopilosa* that we found under Mt. Mangart (mainly on the extensive grasslands of Jarečica) and on shady slopes of Mts. Skutnik (Sončni Jelenk), Zadnji Pelc, Plešivec and Bedinji Vrh, at the elevations ranging from 2050 to 2500 m, and observed from afar also elsewhere on the ledges and prominences of the rock wall of Loška Stena. We made 15 relevés. Slightly similar stands with dominating *Luzula alpinopilosa* were recorded at the elevations from 2000 to 2400 m in the Carnic Alps (Friuli Venezia Giulia) and provisionally classified into the association *Luzuletum alpino-pilosae* Br.-Bl. in Br.-Bl. et Jenny 1926 (Poldini & Vidali 1995: 167). In this autonomous region in the northeast of Italy, this species occurs more frequently than in Slovenia (Poldini 2002: 303). It was recorded also in the stands of associations *Salicetum retuso-reticulatae*, *Sieversio-*



**Figure 1:** Distribution of *Luzula alpinopilosa* in Slovenia (according to the data in FloVegSi database, authors B. Anderle, I. Dakskobler, A. Martinčič, A. Podobnik, B. Surina, B. Vreš, T. Wraber) and approximate localities of studied stands.

**Slika 1:** Razširjenost vrste *Luzula alpinopilosa* v Sloveniji (po podatkih v bazi FloVegSi, avtorji B. Anderle, I. Dakskobler, A. Martinčič, A. Podobnik, B. Surina, B. Vreš, T. Wraber) in približna nahajališča preučanih sestojev.

*Oxyrietum digynae* and *Hieracietum intybacei* (Poldini & Martini 1993). The association *Luzuletum spadiceae* Rübli 1911 in the Alps comprises initial communities of alpine screes, erosion areas, landslide areas, snow beds on silicate bedrock (Englisch 1993: 396–398, Pignatti & Pignatti 2014: 477). The association *Taraxaco carinthiaci-Luzuletum alpino-pilosae* (Lasen 1982, Pignatti & Pignatti 2014: 476–477) is reported for the southern limestone Alps in northern Italy, in terrain depressions with long-lasting snow cover. The parent material is flint limestone. In the Austrian part of the Central Alps, in the Lower (Niedere) Tauern, in the Radstadt (Radstädter) Tauern Heiselmayer (1982) described the subassociation *Luzuletum alpinopilosae salicetosum retusae*, whose stands are characteristic for silicate areas with an admixture of calcareous rocks and occurring on gentle to steep shady slopes at the elevations ranging between 2100 and 2300 m. Its differential species are *Salix retusa*, *Silene acaulis*, with a lower frequency also *Sesleria caerulea* and *Carex sempervirens*. Our syntaxonomic classification of the stands with dominant *Luzula alpinopilosa* from the Julian Alps was based on the comparison with similar alpine woodrush communities in the Alps.

## Methods

Alpine grasslands with dominant *Luzula alpinopilosa* were studied applying the Braun-Blanquet method (Braun-Blanquet 1964). The relevés from Slovenia were entered into the FloVegSi database (Fauna, Flora, Vegetation and Paleovegetation of Slovenia) of the Jovan Hadži Institute of Biology at ZRC SAZU (T. Seliškar et al. 2003) and together with relevés from Friuli Venezia Giulia arranged into Table 1 based on hierarchical classification. We transformed the combined cover-abundance values with numerical values (1–9) according to van der Maarel (1979). Numerical comparisons were performed with the SYN-TAX 2000 program package (Podani 2001). The relevés were compared by means of “(unweighted) average linkage method” – UPGMA, using Wishart’s similarity ratio. Communities from Slovenia and Friuli were compared with similar, already described communities in the Alps. We constructed a synthetic table (Table 2). Hierarchical classification was employed in this comparison as well, and the same method was used as in our comparison of individual relevés, but the measure of dissimilarity was also Jaccard’s Index.

The nomenclatural source for the names of vascular plants are the Mala flora Slovenia (MFS – Martinčič et al. 2007), Flora alpina (Aeschimann et al. 2004a,b,c) and Poldini et al. (2001). The nomenclature of Flora alpina – *Sesleria caerulea* was used for the taxon *Sesleria caerulea* subsp. *calcaria* (MFS) and *Gnaphalium* for the genus *Omalotheca* (MFS). The nomenclature of Vascular flora of Friuli Vene-

zia Giulia was used for the taxon *Achillea clavennae*. Frahm & Frey (1992) and Martinčič (2003) are the nomenclatural source for the names of mosses, and Wirth (1995) and Suppan et al. (2000) for the names of lichens. The names of syntaxa follow Englisch (1993), Grabherr & Mucina (1993), Theurillat (2004), Surina & Dakskobler (2017), Šilc & Čarni (2012) and Mucina et al. (2016). In the classification of species into phytosociological groups (groups of diagnostic species) we mainly refer to the Flora alpina (Aeschimann et al. 2004a,b). The geographic coordinates of relevés from Slovenia are determined according to the Slovenian geographic coordinate system D 48 (5th zone) on the Bessel ellipsoid and with Gauss-Krüger projection.

All of the relevés discussed in this article were made in the alpine belt of the Julian and Carnic Alps. The geological bedrock in the study area is mainly calcareous, limestone and dolomite limestone, interlayered with more silicate rocks, marlstone, claystone and chert (Buser 2009), in the Carnic Alps Werfen sandstone and limestone. The studied communities occur on different forms of rendzina (rendzina on limestone with chert intercalations), and on Eutric or Dystric Ranker (Vidic et al. 2015). The climate is montane, with mean annual precipitation of 2500 to 3000 mm (Zupančič 1998) and mean annual air temperature of -2 to 0 °C (Cegnar 1998). The researched stands are usually covered with snow from November to June. The growing season usually lasts from the middle of June to the end of September (or beginning of October).

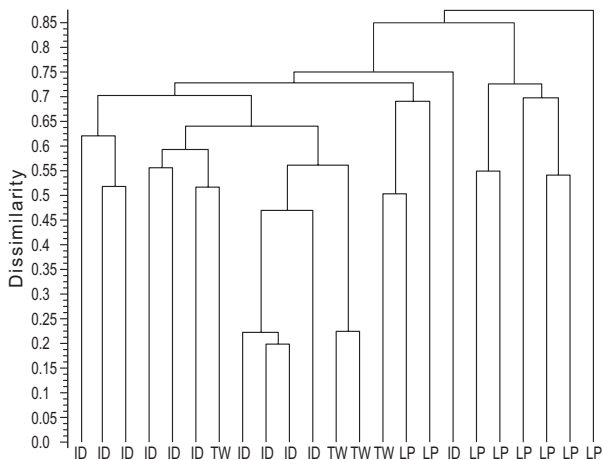
## Results and discussion

Through hierarchical classification as demonstrated in Figure 2, the 15 stands of alpine grasslands with dominant *Luzula alpinopilosa* from the Julian Alps (made by ID Igor Dakskobler and TW Tone Wraber) in Figure 1 and 8 relevés from the Carnic Alps (made by LP Livio Poldini) grouped together. Most of the relevés from the Carnic Alps, except for two, formed a separate cluster, so we marked the relevés from the Julian Alps TWID and the relevés from the Carnic Alps LP (Table 2, synthetic table).

The following syntaxa were also arranged in the synthetic table:

- BB *Luzuletum spadiceae*, Central Alps, Braun-Blanquet & Jenny (1926, Table 5, relevés 12–14)
- CL *Taraxaco carinthiaci-Luzuletum alpinopilosae*, Alps near Feltre, Lasen 1982
- PH *Luzuletum alpinopilosae salicetosum retusae* Heiselmayer 1982, Radstädter Tauern (Central Alps in Austria), Heiselmayer (1982, Table 8, Columns 3–5).

The synthetic table does not comprise snow bed communities from the High Tauern, which Friedel (1956) classified as the association *Juncetum jacquinii* whereas



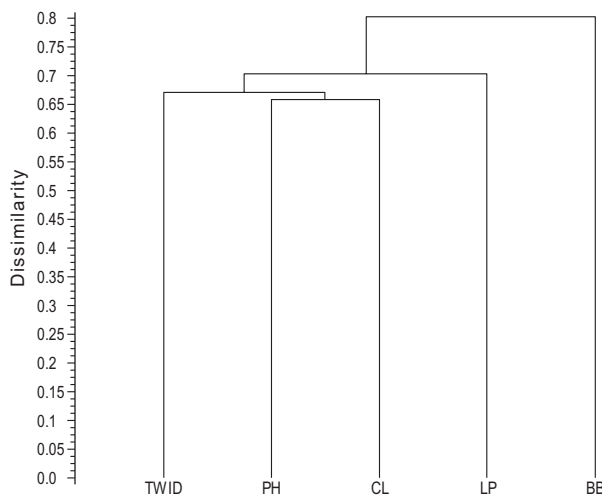
**Figure 2:** Dendrogram of alpine grassland communities with dominant *Luzula alpinopilosa* from the Julian Alps (ID, TW) and Carnic Alps (LP), UPGMA, 1-similarity ratio.

**Slika 2:** Dendrogram alpskih združb s prevladujočo vrsto *Luzula alpinopilosa* v Julijskih Alpah (ID, TW) in Karnijskih Alpah (LD), UPGMA, Wishartov količnik različnosti (1-similarity ratio).

Englich (1993) discussed it in the framework of the association *Luzuletum spadiceae*. Friedel's relevé characterises a syntaxon with dominant *Salix herbacea* and *Juncus jacquini*, and indicates the presence of *Luzula alpinopilosa*, so it is clearly different from our relevés.

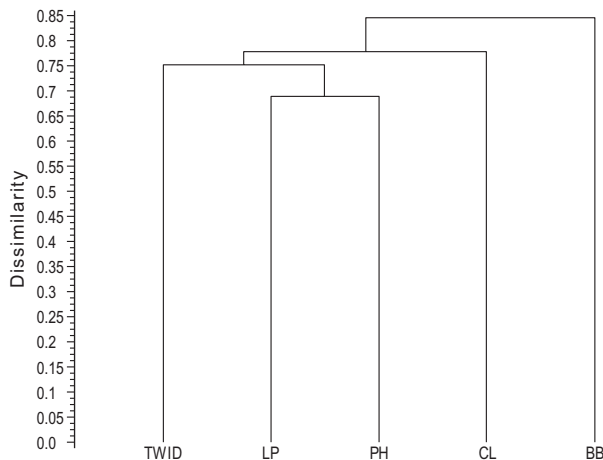
Hierarchical classification was performed in two ways, by taking into account the constancy of species (Figure 3) and by taking into account only presence or absence of species (Figure 4).

The results are not similar, but indicate that the communities with dominant *Luzula alpinopilosa* on mixed, calcareous-silicate bedrock are floristically distinctly different



**Figure 3:** Dendrogram of five communities with dominant *Luzula alpinopilosa* in the Alps, UPGMA, 1-similarity ratio.

**Slika 3:** Dendrogram petih združb s prevladujočo vrsto *Luzula alpinopilosa* v Alpah, UPGMA, Wishartov količnik različnosti (1-similarity ratio).



**Figure 4:** Dendrogram of five communities with dominant *Luzula alpinopilosa* in the Alps, UPGMA, 1-Jaccard.

**Slika 4:** Dendrogram petih združb s prevladujočo vrsto *Luzula alpinopilosa* v Alpah, Jaccardov količnik različnosti (1-Jaccard).

from communities with this species on silicate bedrock and cannot reliably be classified into the same association. The relevés from the Julian Alps cannot be classified into the association *Taraxaco-Luzuletum alpinopilosae* either, because floristic similarity between them (according to Sørensen 1948) is only about 35%, even though the taxon *Taraxacum carinthiacum* also belongs into the section *Taraxacum* sect. *Alpina* that occurs in several relevés also in the stands from the Julian Alps. In terms of Sørensen's similarity index (1948) the floristic similarity of the stands from the Julian Alps with the stands of the subassociation *Luzuletum alpinopilosae salicetosum retusae* is only about 40%, although both compared communities comprise several shared diagnostic species (*Salix retusa*, *S. reticulata*, *Juncus jacquini*, *Geum montanum*, *Potentilla aurea*, *Homogyne alpina*, *Silene acaulis*, *Galium anisophyllum*, *Doronicum glaciale*). The reason for low floristic similarity between these two syntaxa is that their stands occur in very different phytogeographical areas (Southeast Limestone Alps and Central Alps, respectively) and also in different ecological conditions. Considering only the presence and absence of species the relevés from the Carnic Alps are the most similar to the relevés from the Lower Tauern (Niedere Tauern) in Austria; when taking into account the species constancy, the similarity is smaller and the relevés group separately.

As *Salix retusa* is very rare in the relevés of the stands from the Carnic Alps, classification into the subassociation *Luzuletum alpinopilosae salicetosum retusae* is not optimal, because of the absent *Taraxacum carinthiacum* (*Taraxacum* sect. *Alpina*), nor can it be classified into the association *Taraxaco carinthiaci-Luzuletum alpinopilosae*. Because two of the relevés from the Carnic Alps are floristically closer to some of the relevés from the Julian Alps

(see Figure 2), other relevés from the Carnic Alps could also still be treated in the framework of the community from the Julian Alps. Based on the comparisons made, we classify the studied stands from the Julian and Carnic Alps into the new association *Junco jacquinii-Luzuletum alpinopilosae*. Its diagnostic species are *Luzula alpinopilosa*, *Juncus jacquinii*, *Geum montanum*, *Rhodiola rosea*, *Phleum rhaeticum* and *Trifolium pallelescens*. The geographical differential species are *Doronicum glaciale*, *Homogyne discolor* and *Astrantia bavarica*. Diagnostic species characterise nutrient-rich, moist and slightly acidic alpine grasslands on mixed geological bedrock in the (South)Eastern Alps. The nomenclatural type, *holotypus*, of the new association is relevé 9 in Table 1. The classification of the new association into higher syntaxonomic units is very problematic. According to the groups of diagnostic species (Table 3, Columns 1 and 2) the proportion of the species of the class *Elyno-Seslerietea* (including syntaxa *Caricion ferrugineae*, *Oxytropido-Elynion*, *Caricion austroalpinae*, *Caricion firmae*, *Seslerion coeruleae*) totals 28.44% (for the subunits from the Julian Alps), and 13.27% (for the subunit from the Carnic Alps). The proportion of the diagnostic species of the class *Juncetea trifidi* (including syntaxa *Nardion strictae*, *Loiseleurio-Vaccinietaea*, *Vaccinio-Piceetea* and *Oxycocco-Sphagnetea*) is 24.74% (for the subunits from the Julian Alps) and 43.33% (for the subunit from the Carnic Alps). The proportion of diagnostic species of classes *Salicetea herbaceae* and *Thlaspietea rotundifolii* (including syntaxa *Androsacetalia alpinae* and *Arabidetalia caeruleae*) is 18.63% (for the subunits from the Julian Alps) and 27.33% (for the subunit from the Carnic Alps). Beside these groups, at least in the subunits from the Julian Alps, there is a relatively high proportion of diagnostic species of the class *Mulgedio-Aconitetea* (10.4%) and of the order *Poo alpinae-Trisetetalia* (9.38%). According to this analysis classification into the classes *Salicetea herbaceae* or *Thlaspietea rotundifolii* is not possible. If we had to decide between classes *Elyno-Seslerietea* and *Juncetea trifidi*, the last would have priority, because *Juncus jacquinii* and *Geum montanum*, two frequent diagnostic species of the new association, both belong into this class. There are two syntaxa of this class for the communities in the Southeastern Alps: *Caricion curvulae* Br.-Bl. 1925 (order *Caricetalia curvulae*), which includes alpine sedge swards on siliceous substrates of the Alps, and the Eastern and Southern Carpathians and order *Festucetalia spadiceae* Barbero 1970, which includes acidophilic subalpine and alpine species-rich grasslands of the Alps, the Carpathians and the Northern Apennines, with two alliances, *Nardion strictae* and *Festucion variae* (Mucina et al. 2016: 79). Our community does not fit entirely into any of these tree alliances, so we suggest a description of a new alliance

*Doronicum glacialis-Juncion jacquinii* all. nov. prov. (order *Festucetalia spadiceae*) with diagnostic species *Luzula alpinopilosa*, *Juncus jacquinii*, *Leontodon helveticus*, *Geum montanum*, *Carex ferruginea*, *Festuca nigrescens*, *Salix retusa*, *Doronicum glaciale* and *Homogyne discolor*. In the new alliance should be included species rich alpine grassland communities on mixed carbonate-silicate parent material and on moist (shady) sites with long snow cover in the (South)Eastern Alps (communities with relatively equivalent proportion of diagnostic species of the classes *Juncetea trifidi*, *Elyno-Seslerietea* and *Salicetea herbaceae*, including *Thlaspietea rotundifolii*, but with dominant species of the classes *Juncetea trifidi* or *Salicetea herbaceae*).

We distinguish three subassociations of the new association:

- *galietosum anisophyllae* subass. nova hoc loco with differential species *Galium anisophyllum*, *Potentilla crantzii*, *Pedicularis verticillata* and *Koeleria eryostachia*; also differential are other diagnostic species of the syntaxa *Caricion austroalpinae*, *Seslerion coeruleae*, *Elyno-Seslerietea* and also *Arabidetalia caeruleae*, which indicate predominantly calcareous bedrock and contact with alpine grasslands from the class *Elyno-Seslerietea*. The nomenclatural type, *holotypus*, of the new subassociation is relevé 5 in Table 1.
- *potentilletosum aureae* subass. nova hoc loco, with differential species *Potentilla aurea*, *Soldanella pusilla* and *Rumex arifolius*. Its nomenclatural type, *holotypus*, is the same as the nomenclatural type of the new association, relevé 9 in Table 1, and characterises the typical form of a moist alpine grassland on mixed calcareous-silicate bedrock.
- *leucanthemopsietosum alpinae* subass. nova hoc loco, with differential species *Leucanthemopsis alpina*, *Hieracium alpinum* and *Arenaria biflora*. Its nomenclatural type, *holotypus*, is relevé 18 in Table 1 and comprises relevés from the Carnic Alps that are floristically very different and could be classified also into the association *Luzuletum alpinopilosae* s. lat.

## Conclusions

*Luzula alpinopilosa* is relatively rare in Slovenia and occurs only in the alpine belt in the Julian Alps, on areas with persistent snow cover where the soil is consequently moist and, due to silicate intercalations, also acidic. It is characteristic for snow bed communities (*Salicetum herbaceae* s. lat.) as well as for alpine grasslands in gullies and shady promontories classified into the new association *Junco jacquinii-Luzuletum alpinopilosae*. Its classification into higher syntaxonomic units is very problematic, so we suggest a description of a new alliance *Doronicum*

*glacialis-Juncion jacquinii* all. nov. prov. (order *Festucetalia spadiceae* and class *Juncetea trifidi*). Larger areas of these grasslands are on ledges under the ridge of the rock wall of Loška Stena (especially in its northeastern part, from Mt. Bedinji Vrh to Mt. Plešivec) and under Mt. Mangart, smaller areas also under several other summits. Their past development was largely the result of grazing of small ruminants, in particular sheep, and this impact is still evident today (regular grazing of sheep on Jarečica under Mt. Mangart, occasional smaller flocks on the ridge of Loška Stena from Mt. Plešivec to Mt. Bedinji Vrh). Shady ledges under the rock wall of Loška Stena are frequently visited also by chamois (Kozje Police under Bedinji Vrh). This high-mountain region is very difficult to access, so there are no other direct human impacts here. Syndynamically, these stands can be connected with the rusty sedge community (*Caricetum ferruginae* s. lat.), in places even with tall herb communities (*Aconito-Peucedanetum ostruthii*). They are the sites of several rare or endangered Red List species (Anonymous 2002): *Carex curvula*, *Coeloglossum viride*, *Helictotrichon versicolor* (= *Helictochloa versicolor*), *Juncus trifidus*, *Luzula alpinopilosa* and *Trifolium thalii*. Stands with the dominant *Luzula alpinopilosa* in the Carnic Alps in northeastern Italy are different in terms of ecology and species composition. Because some of them are classified into the subassociation *Junco jacquini-Luzuletum alpinopilosae potentilletosum aureae*, it is, for now, possible also for other relevés from this area to be classified into the same association as the new subassociation *-leucanthemopsietosum alpinae*.

## Povzetek

### Alpinska travišča s prevladujočo vrsto *Luzula alpinopilosa* v Julijskih in Karnijskih Alpah

Fitocenološko smo preučili alpinska travišča v žlebovih in na osojnih pomolih na nadmorski višini med 2100 m in 2500 m v Julijskih Alpah (Mangart, Jarečica, Plešivec, Bedinji vrh, Zadnji Pelc, Skutnik/Sončni Jelenk) in Karnijskih Alpah, v katerih prevladuje vrsta *Luzula alpinopilosa* in jih na podlagi primerjav s podobnimi združbami drugod v Alpah uvrstili v novo asociacijo *Junco jacquini-Luzuletum alpinopilosae*. Njene diagnostične vrste so *Luzula alpinopilosa*, *Juncus jacquinii*, *Geum montanum*, *Rhodiola rosea*, *Phleum rhaeticum* in *Trifolium pallescens*, geografske razlikovalnice pa vrste *Doronicum glaciale*, *Homogyne discolor* in *Astrantia bavarica*. Označujejo s hranili bogata, vlažna in nekoliko zakisana alpinska travišča na mešani geološki podlagi. Uvrstitev nove asociacije v višje sintaksonomske enote je nekoliko problematična, saj so v njej precej enakovredno zastopane diagnostične vrste treh oz. štirih razredov (*Juncetea trifidi*, *Elyno-Seslerietea*

in *Thlaspietea rotundifolii*, vključno z razredom *Salicetea herbaceae*). Predlagamo opis nove zveze *Doronicum glacialis-Juncion jacquinii* znotraj reda *Festucetalia spadiceae* in razreda *Juncetea trifidi*. Razlikujemo tri subasociacije: *galietosum anisophyllae* z razlikovalnicami *Galium anisophyllum*, *Potentilla crantzii*, *Pedicularis verticillata* in *Koeleria eryostachia*, razlikovalne pa so tudi druge diagnostične vrste sintaksonov *Caricion austroalpinae*, *Seslerion coeruleae*, *Elyno-Seslerietea* in tudi *Arabidetalia caeruleae*, ki kažejo na prevladujočo karbonatno podlago in na stik s alpskimi travišči iz razreda *Elyno-Seslerietea*, *-potentilletosum aureae*, z razlikovalnicami *Potentilla aurea*, *Soldanella pusilla* in *Rumex arifolius*, ki označuje tipično obliko vlažnega alpskega travišča na mešani karbonatno-silikatni podlagi in *-leucanthemopsietosum alpinae* z razlikovalnicami *Leucanthemopsis alpina*, *Hieracium alpinum* in *Arenaria biflora*, v kateri so združeni le nekateri popisi iz Karnijskih Alp, ki so floristično precej drugačni in bi jih bilo mogoče uvrstiti tudi v asociacijo *Luzuletum alpinopilosae* s. lat. Na razvoj teh floristično za Julijske Alpe precej posebnih travišč je v preteklosti precej vpliva paša drobnice, predvsem ovac in ta vpliv se kaže še zdaj (pogosta paša ovac na Jarečici pod Mangartom, občasni manjši tropi na grebenu Loške stene od Plešivca do Bedinjega vrha in naprej Moreža). Na osojnih policah pod Loško steno (na primer Kozje police pod Bedinjim vrhom) se pogosto zadržujejo tudi gamsi. Drugih neposrednih človekovih posegov na ta težko dostopna pobočja ni. Sindinamsko so ti sestoji lahko povezani z združbo rjastega šaša (*Caricetum ferruginae* s. lat.), ponekod celo z združbami visokih steblik (*Aconito-Peucedanetum ostruthii*). So rastišča več redkih ali ogroženih vrst iz rdečega seznama (Anonymous 2002): *Carex curvula*, *Coeloglossum viride*, *Helictotrichon versicolor*, *Juncus trifidus*, *Luzula alpinopilosa* in *Trifolium thalii*.

## Acknowledgements

We would like to thank the heirs of the late Prof. Dr. Tone Wraber for giving his manuscripts and professional literature to the safekeeping of the Botanical Garden of the University of Ljubljana, and to its director, Dr. Jože Bavcon, who allowed us to examine professor's legacy. We owe special thanks to Brane Anderle, Prof. Dr. Andrej Martinčič, mag. Andrej Podobnik, mag. Andrej Seliškar, Prof. Dr. Boštjan Surina and Dr. Branko Vreš, co-authors of Figure 1 and to Prof. Dr. Božo Frajman for his help with some literature sources. Anonymous reviewer helped us with valuable improvements and corrections. We also acknowledge the financial support from the Slovenian Research Agency (research core funding No. P1-0236). English translation by Andreja Šalamon Verbič.

## References

- Aeschimann, D., Lauber, K., Moser, D. M. & Theurillat, J.-P. 2004a: Flora alpina. Bd. 1: *Lycopodiaceae–Apiaceae*. Haupt Verlag, Bern, Stuttgart, Wien, 1159 pp.
- Aeschimann, D., Lauber, K., Moser, D. M. & Theurillat, J.-P. 2004b: Flora alpina. Bd. 2: *Gentianaceae–Orchidaceae*. Haupt Verlag, Bern, Stuttgart, Wien, 1188 pp.
- Aeschimann, D., Lauber, K., Moser, D. M. & Theurillat, J.-P. 2004c: Flora alpina. Bd. 3: Register. Haupt Verlag, Bern, Stuttgart, Wien, 322 pp.
- Anonymous 2002: Pravilnik o uvrstitvi ogroženih rastlinskih in živalskih vrst v rdeči seznam. Uradni list RS 82/2002.
- Braun-Blanquet, J. & Jenny, J. 1926: Vegetationsentwicklung und Bodenbildung in der alpinen Stufe der Zentralalpen. Denkschr. Schweiz. Naturforsch. Ges. Zürich 63: 183–349.
- Braun-Blanquet, J. 1964: Pflanzensoziologie. Grundzüge der Vegetationskunde. 3. Auflage. Springer, Wien – New York, 865 pp.
- Buser, S. 2009: Geološka karta Slovenije 1: 250.000. Geological map of Slovenia 1: 250,000. Geološki zavod Slovenije, Ljubljana.
- Cegnar, T. 1998: Temperatura zraka. In: Fridl, J., Kladnik, D., Orožen Adamič, M. & Perko, D. (eds.): Geografski atlas Slovenije. Država v prostoru in času. Državna založba Slovenije, Ljubljana, pp. 100–101.
- Englisch, T. 1993: *Salicetea herbaceae*. In: Mucina, L., Grabherr, G. & Ellmauer, T. (eds.): Die Pflanzengesellschaften Österreichs. Teil II. Gustav Fischer Verlag, Jena. pp. 389–399.
- Frahm, J. P. & Frey, W. 1992: Moosflora. 3. Aufl. UTB, Ulmer, Verlag, Stuttgart, 528 pp.
- Friedel, H. 1956: Alpine Vegetation des obersten Mölltales (Hohe Tauern). Wissenschaftliche Alpenvereinshefte, Heft 16: 1–153, Universitätsverlag Wagner, Innsbruck.
- Grabherr, G. & Mucina, L. (eds.) 1993: Die Pflanzengesellschaften Österreichs. Teil II: Natürliche waldfreie Vegetation. Gustav Fischer Verlag, Jena - Stuttgart - New York. 523 pp.
- Heiselmayer, P. 1982: Die Pflanzengesellschaften des Tappenkars (Radstädter Tauern). Stapfia 10: 161–202.
- Lasen, C. 1982: Vegetazione nivale a *Luzula alpinopilosa* nelle Alpi Feltrine. Studi Trentini di Scienza Naturale 59: 31–40.
- Maarel van der, E. 1979: Transformation of cover-abundance values in phytosociology and its effects on community similarity. Vegetatio 39 (2): 97–114.
- Martinčič, A. 2003: Seznam listnatih mahov (*Bryopsida*) Slovenije. Hacquetia 2 (1): 91–166.
- Martinčič, A., Wraber, T. & Dakskobler, I. 2019: Snowbed communities with dominant *Salix herbaceae* in the Julian Alps. Hacquetia 18 (1): 47–73.
- Martinčič, A., Wraber, T., Jogan, N., Podobnik, A., Turk, B., Vreš, B., Ravnik, V., Frajman, B., Strgulc Krajšek, S., Trčak, B., Bačič, T., Fischer, M. A., Eler, K. & Surina, B. 2007: Mala flora Slovenije. Ključ za določanje praprotnic in semenk. Četrta, dopolnjena in spremenjena izdaja. Tehniška založba Slovenije, Ljubljana, 967 pp.
- Mucina, L., Bültmann, H., Dierßen, K., Theurillat, J.-P., Raus, T., Čarni, A., Šumberová, K., Willner, W., Dengler, J., Gavilán García,
- R., Chytrý, M., Hájek, M., Di Pietro, R., Iakushenko, D., Pallas, J., Daniěls, F. J. A., Bergmeier, E., Santos Guerra, A., Ermakov, N., Valachovič, M., Schaminée, J. H. J., Lysenko, T., Didukh, Y. P., Pignatti, S., Rodwell, J. S., Capelo, J., Weber, H. E., Solomeshch, A., Dimopoulos, P., Aguiar, C., Hennekens, S. M. & Tichý, L. 2016: Vegetation of Europe: hierarchical floristic classification system of vascular plant, bryophyte, lichen, and algal communities. Applied Vegetation Science 19, Supplement 1: 3–264.
- Pignatti, E. & Pignatti, S. 2014: Plant Life of the Dolomites. Vegetation Structure and Ecology. Publication of the Museum of Nature South Tyrol Nr. 8, Naturmuseum Südtirol, Bozen, Springer Verlag, Heidelberg, 769 pp.
- Podani, J. 2001: SYN-TAX 2000. Computer Programs for Data Analysis in Ecology and Systematics. User's Manual, Budapest, 53 pp.
- Poldini, L. & Martini, F. 1993: La vegetazione delle vallette nivale su calcare, dei conoidi e delle alluvioni nel Friuli (NE Italia). Studia Geobotanica 13: 141–214.
- Poldini, L. (with collaboration of G. Oriolo & M. Vidali), 2002: Nuovo Atlante corologico delle piante vascolari nel Friuli Venezia Giulia. Regione Autonoma Friuli Venezia Giulia, Azienda Parchi e Foreste Regionali & Università degli Studi di Trieste, Dipartimento di Biologia, Udine, 529 pp.
- Poldini, L., Oriolo, G. & Vidali, M. 2001: Vascular flora of Friuli Venezia Giulia. An annotated catalogue and synonymic index. Studia Geobotanica 21: 3–227.
- Poldini, L. & Vidali, M. 1995: Prospetto sistematico della vegetazione nel Friuli-Venezia Giulia. Atti dei Convegni Lincei 115. XI Giornata dell' Ambiente Convegno sul tema: La Vegetazione Italiana (Roma, 5 giugno 1993), Accademia nazionale dei Lincei, Roma. pp. 155–174.
- Seliškar, T., Vreš, B. & Seliškar, A. 2003: FloVegSi 2.0. Računalniški program za urejanje in analizo bioloških podatkov. Biološki inštitut ZRC SAZU, Ljubljana.
- Sørensen, Th. 1948: A method of establishing groups of equal amplitude in plant sociology based on similarity of species content. Det Kongelige Danske Videnskabernes Selskab, Biologiske Skrifter 5 (4): 1–34.
- Suppan, U., Prügger, J. & Mayrhofer, H. 2000: Catalogue of the lichenized and lichenicolous fungi of Slovenia. Bibliotheca Lichenologica 76: 1–215.
- Šilc, U. & Čarni, A. 2012: Conspectus of vegetation syntaxa in Slovenia. Hacquetia 11 (1): 113–164.
- Theurillat, J.-P. 2004: Pflanzensoziologisches System. In: Aeschimann, D., Lauber, K., Moser, D. M. & Theurillat, J.-P.: Flora alpina, 3. Haupt Verlag, Bern, Stuttgart, Wien, pp. 301–313.
- Vidic, N. J., Prus, T., Grčman, H., Zupan, M., Lisec, A., Kralj, T., Vrščaj, B., Ruprecht, J., Šporar, M., Suhadolc, M., Mihelič, R. & Lobnik, F. 2015: Tla Slovenije s pedološko karto v merilu 1 : 250 000. Soils of Slovenia with soil map 1 : 250 000. European Union & University of Ljubljana, Luxembourg, Ljubljana, 152 pp. + maps.
- Wirth, V. 1995: Flechtenflora. 2. Auf. Verlag Eugen Ulmer, Stuttgart, 661 pp.
- Zupančič, B. 1998: Padavine. In: Fridl, J., Kladnik, D., Orožen Adamič, M. & Perko, D. (eds.): Geografski atlas Slovenije. Država v prostoru in času. Državna založba Slovenije, Ljubljana, pp. 98–99.

**Table 1 (Tabela 1):** *Juncus jacquinii-Luzuletum alpinopilosae* ass. nov.

Number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7	
Database number of relevé (Delovna številka popisa)		244129	244368	254629	249420	253414	269501	270585	
Author of the relevé (Avtor popisa)		ID	ID	ID	ID	ID	ID	TW	
Elevation in m (Nadmorska višina v m)		2165	2295	2172	2245	2195	2160	2500	
Aspect (Lega)		NW	NW	N	NW	NW	N	W	
Slope in degrees (Nagib v stopinjah)		30	35	15	25	15	35	25	
Parent material (Matična podlaga)		A	A	A	ALR	AL	AL	A	
Soil (Tla)		Re	Re	Re	Dy	Dy	Re	Re	
Stoniness in % (Kamnitost v %)		5	5	5	.	.	1	.	
Cover of herb layer in % (Zastiranje zeliščne plasti v %):		E1	90	95	95	100	100	95	100
Cover of moss layer in % (Zastiranje mahovne plasti v %)		E0	.	.	5	.	.	.	
Number of species (Število vrst)			41	34	27	30	31	35	13
Relevé area (Velikost popisne ploskve)		m <sup>2</sup>	10	3	4	10	20	20	50
Date of relevé (Datum popisa)			7/27/2012	8/14/2012	10/3/2014	8/8/2013	7/7/2014	7/28/2017	8/8/1983
Locality (Nahajališče)			Skurnik	Zadnji Pelc	Bedinji vrh	Mangart-Jarečica	Mangart-Jarečica	Plešivec-Loška stena	Mangart
Quadrant (Kvadrant)			9648/1	9648/1	9547/4	9547/4	9547/4	9547/4	9547/4
Coordinate GK Y (D-48)		m	398104	398303	396333	396532	396434	397287	396782
Coordinate GK X (D-48)		m	5138943	5139902	5140727	5144671	5144669	5141443	5144760
<b>Diagnostic species of the association (Diagnostične vrste asociacije)</b>									
SH	<i>Luzula alpinopilosa</i>	E1	1	4	4	4	4	3	4
JT	<i>Juncus jacquinii</i>	E1	2	.	.	3	+	3	3
JT	<i>Geum montanum</i>	E1	.	.	.	+	1	.	.
TR	<i>Rhodiola rosea</i>	E1	.	.	1	.	1	3	2
AC	<i>Trifolium pallescens</i>	E1	2	2	.	+	1	1	2
PaT	<i>Phleum rhaeticum</i>	E1	1	+	.	.	.	.	.
AC	<i>Doronicum glaciale</i>	E1	.	.	.	+	.	+	.
ES	<i>Homogyne discolor</i>	E1	+	1	.	1	.	+	.
ES	<i>Astrantia bavarica</i>	E1	1	.	.	.	.	+	.
<b>Differential species of the subassociations (Razlikovalne vrste subasociacij)</b>									
SV	<i>Galium anisophyllum</i>	E1	+	1	+	+	+	1	1
ES	<i>Pedicularis verticillata</i>	E1	+	.	1	+	+	1	1
SV	<i>Potentilla crantzii</i>	E1	+	+	+	.	1	.	1
CA	<i>Koeleria eriostachya</i>	E1	1	+	+	.	.	.	+



8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Pr.	Fr.
269491	269492	269495	269498	270583	270598	270601	P6	P7	269507	P1	P4	P2	P3	P8	P5		
ID	ID	ID	ID	TW	TW	TW	LP	LP	ID	LP	LP	LP	LP	LP	LP		
2185	2185	2180	2140	2125	2125	2050	2400	2420	2040	2190	2030	2010	2080	2060	2400		
NNE	N	W	NNE	W	W	NW	N	S	NE	N	S	SW	S	SSW	N		
35	25	30	40	15	15	15	10	30	40	45	40	35	35	30	5		
AL	AL	AG	AL	ALR	ALR	ALR	A	A	AL	WS	WS	WS	WS	WS	A		
Re	Re	Re	Re	Dy	Dy	Dy	Re	Re	Re	Dy	Dy	Dy	Dy	Dy	Re		
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
100	100	100	95	100	100	100	100	100	100	25	30	50	40	40	40		
.	.	.	.	.	.	.	80	.	.	.	.	.	.	.	.		
12	19	18	32	13	15	13	15	22	20	21	16	23	29	17	17		
4	4	5	20	10	6	4	15	15	20	120	50	45	150	15	15		
7/28/2017	7/28/2017	7/28/2017	7/28/2017	8/7/1983	8/7/1983	8/9/1983	8/2/1970	7/28/1977	7/28/2017	1967-68	1967-68	1967-68	1967-68	8/13/1968	8/2/1970		
Bala-Plešivec	Plešivec-Loška stena	Plešivec-Loška stena	Plešivec-Loška stena	Mangart-Jarečica-	Mangart-Jarečica	Mangart-Rdeča glava	M. Peralba, sotto il Passo di Sesis	M. Bivera	Plešivec-Bala	M. Valsecca (M. Crostis-Zoufplan)	Torodon di Sopra (M. Crostis-Zoufplan)	Sella Bioichia (M. Crostis-Zoufplan)	Malga Crostis (M. Crostis-Zoufplan)	M. Crostis	M. Peralba -Passo di Sesis		
5141573	5141573	5141565	5141510	5144512	5144364	5145176	.	.	5141375	.	.	.	.	.	.		
397395	397391	397374	397327	396300	396256	395971	.	.	397508	.	.	.	.	.	.		
9547/4	9547/4	9547/4	9547/4	9547/4	9547/4	9547/4	9342/3	9541/4	9548/3	9443/4	9443/2	9443/1	9443/1	9443/1	9342/3		
4	4	4	3	5	4	5	4	4	4	1	1	2	1	1	1	23	100
1	1	1	1	+	+	.	.	.	.	1	.	2	.	.	.	13	57
+	1	1	2	2	2	+	.	+	.	+	1	1	+	+	.	15	65
.	r	+	2	.	.	.	.	.	3	.	.	.	.	.	.	8	35
.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	9	39
1	+	1	.	.	+	+	.	.	1	.	.	.	.	.	.	8	35
.	.	.	.	.	.	.	.	.	.	1	+	+	+	.	.	6	26
.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	5	22
.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	4	17
.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	9	39
.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	30
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	22
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	17

Number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7
JT	<i>Potentilla aurea</i>	E1	.	.	.	+	.	.
MuA	<i>Rumex arifolius</i>	E1	.	.	.	.	.	.
SH	<i>Soldanella pusilla</i>	E1	.	.	.	.	.	.
JT	<i>Leucanthemopsis alpina</i> (= <i>Tanacetum alpinum</i> )	E1	.	.	.	.	.	.
JT	<i>Hieracium alpinum</i>	E1	.	.	.	.	.	.
ES	<i>Arenaria biflora</i>	E1	.	.	.	.	.	.
NS	<b><i>Nardion strictae</i></b>							
	<i>Festuca nigrescens</i>	E1	.	.	.	.	.	.
	<i>Coeloglossum viride</i>	E1	+	.	+	.	+	.
	<i>Gentiana punctata</i>	E1	.	.	.	.	.	.
	<i>Nardus stricta</i>	E1	.	.	.	.	.	.
	<i>Agrostis capillaris</i>	E1	.	.	.	.	.	.
	<i>Campanula barbata</i>	E1	.	.	.	.	.	.
	<i>Alchemilla flabellata</i>	E1	.	.	.	.	.	.
JT	<b><i>Juncetea trifidi</i></b>							
	<i>Leontodon helveticus</i>	E1	.	.	.	1	+	.
	<i>Anthoxanthum nipponicum</i>	E1	.	.	.	+	2	1
	<i>Campanula scheuchzeri</i>	E1	1	2	.	1	.	1
	<i>Helictotrichon versicolor</i> ( <i>Helictochloa versicolor</i> )	E1	.	.	.	2	.	.
	<i>Agrostis rupestris</i>	E1	+	.	.	.	.	.
	<i>Solidago virgaurea</i> subsp. <i>minuta</i>	E1	+	.	.	.	.	.
	<i>Juncus trifidus</i>	E1	.	.	+	1	1	.
	<i>Luzula spicata</i>	E1	+	+	.	.	.	.
	<i>Euphrasia minima</i>	E1	.	1	+	.	.	.
	<i>Carex curvula</i>	E1	.	.	.	.	.	.
	<i>Oreochloa disticha</i>	E1	.	.	.	.	.	.
	<i>Veronica fruticans</i>	E1	.	.	.	.	.	.
	<i>Pulsatilla alpina</i> subsp. <i>austriaca</i>	E1	.	.	.	.	.	.
	<i>Veronica bellidioides</i>	E1	.	.	.	.	.	.
	<i>Festuca</i> cfr. <i>pseudodura</i>	E1	.	.	.	.	.	.
	<i>Botrychium lunaria</i>	E1	.	+	.	.	.	.
	<i>Primula minima</i>	E1	.	.	.	.	.	.
	<i>Jacobaea carniolica</i> (= <i>Senecio</i> c.)	E1	.	.	.	.	.	.
	<i>Phyteuma hemisphaericum</i>	E1	.	.	.	.	.	.
PaT	<b><i>Poo alpinae-Trisetetalia</i></b>							
	<i>Poa alpina</i>	E1	2	2	2	+	1	2
	<i>Trollius europaeus</i>	E1	.	.	.	1	2	1
	<i>Euphrasia picta</i>	E1	1	.	.	.	.	.
	<i>Crepis aurea</i>	E1	.	.	.	.	.	.
	<i>Trifolium badium</i>	E1	.	.	.	.	1	.
MA	<b><i>Molinio-Arrhenatheretea</i></b>							
	<i>Leontodon hispidus</i>	E1	1	1	+	1	.	2
	<i>Deschampsia cespitosa</i>	E1	.	.	.	.	.	.
	<i>Cerastium fontanum</i>	E1	.	.	.	.	.	.
	<i>Taraxacum</i> sect. <i>Ruderalia</i>	E1	.	.	.	.	.	.
	<i>Trifolium pratense</i>	E1	.	.	+	.	.	.
	<i>Veronica serpyllifolia</i>	E1	.	.	.	.	.	.
LV	<b><i>Loiseleurio-Vaccinietea</i></b>							
	<i>Vaccinium gaultherioides</i>	E1	+	.	.	.	1	.

8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Pr.	Fr.
2	2	1	+	1	.	+	+	.	1	.	.	.	.	.	.	9	39
+	1	1	+	+	.	.	.	+	1	.	.	.	.	+	.	8	35
+	.	.	.	1	+	3	3	.	.	.	.	.	.	.	+	6	26
.	.	.	.	.	.	.	+	.	.	+	.	+	1	1	1	6	26
.	.	.	.	.	.	.	.	.	.	+	1	.	+	+	.	4	17
.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	+	4	17
.	.	+	.	1	1	.	.	.	+	+	1	.	.	+	.	7	30
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	13
.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	2	9
.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4
2	1	2	1	+	1	.	.	.	.	+	+	+	+	+	.	13	57
1	1	1	1	+	+	.	.	.	.	.	.	.	.	.	.	10	43
.	.	.	1	+	.	+	+	.	1	.	.	.	.	.	.	9	39
.	.	.	.	+	1	2	.	1	.	.	+	.	+	.	.	7	30
.	.	.	.	.	1	.	.	.	.	+	.	+	+	+	.	6	26
.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	.	4	17
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	13
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	.	.	+	.	.	1	.	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	1	.	.	.	+	.	.	.	.	2	9
.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	2	9
.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4
2	1	2	2	+	1	1	.	1	1	.	.	.	+	+	+	19	83
.	.	+	1	.	.	.	.	.	2	.	.	.	.	.	.	6	26
.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	3	13
.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	2	9
2	1	+	2	.	.	.	.	+	.	.	.	.	.	.	.	10	43
.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	9

Number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7
VP	<b>Vaccinio-Piceetea</b>							
	<i>Homogyne alpina</i>	E1	.	.	.	1	.	.
	<i>Avenella flexuosa</i>	E1	.	.	.	.	.	.
	<i>Calamagrostis villosa</i>	E1	.	.	.	.	.	.
	<i>Rhytidiadelphus triquetrus</i>	E0	.	.	.	+	+	.
	<i>Vaccinium myrtillus</i>	E1	.	.	.	+	.	.
	<i>Peltigera leucophlebia</i>	E0	.	.	.	.	+	.
	<i>Rhododendron ferrugineum</i>	E2	.	.	.	.	.	.
OA	<b>Oxycocco-Sphagnetea</b>							
	<i>Carex pauciflora</i>		.	.	.	.	.	.
CF	<b>Caricion ferrugineae</b>							
	<i>Cerastium subtriflorum</i>	E1	1	.	.	.	+	1
	<i>Carex ferruginea</i>	E1	.	.	+	.	.	.
	<i>Hedysarum hedysaroides</i>	E1	.	.	.	+	+	.
	<i>Phleum hirsutum</i>	E1	.	.	.	.	.	.
	<i>Gentiana pumila</i>	E1	1	.	.	.	.	.
	<i>Trifolium thalii</i>	E1	.	.	.	.	.	.
OE	<b>Oxytropido-Elyinion</b>							
	<i>Carex atrata</i>	E1	+	+	1	.	+	.
	<i>Antennaria carpatica</i> (incl. subsp. <i>helvetica</i> )	E1	.	.	.	+	+	.
	<i>Gentiana nivalis</i>	E1	r	+	.	.	.	.
	<i>Lloydia serotina</i>	E1	.	.	.	+	+	.
	<i>Arenaria ciliata</i>	E1	.	.	.	+	.	.
	<i>Elyna myosuroides</i> (= <i>Carex myosuroides</i> )	E1	.	.	.	.	.	.
CA	<b>Caricion austroalpiniae</b>							
	<i>Festuca calva</i>	E1	+	.	.	.	.	.
Cfir	<b>Caricion firmae</b>							
	<i>Silene acaulis</i>	E1	.	.	.	+	+	.
	<i>Dryas octopetala</i>	E1	+	.	.	+	.	.
	<i>Minuartia sedoides</i>	E1	+	.	.	.	.	.
	<i>Veronica aphylla</i>	E1	+	.	.	.	.	.
SV	<b>Seslerion coeruleae</b>							
	<i>Achillea clavinae</i>	E1	1	+	+	.	.	.
	<i>Juncus monanthos</i>	E1	r	+	.	.	.	.
	<i>Ranunculus carinthiacus</i>	E1	.	+	.	.	+	.
ES	<b>Elyno-Seslerietea</b>							
	<i>Polygonum viviparum</i>	E1	1	1	+	1	1	+
	<i>Myosotis alpestris</i>	E1	.	.	+	+	1	1
	<i>Thymus praecox</i> subsp. <i>polytrichus</i>	E1	+	+	.	.	.	.
	<i>Cerastium strictum</i>	E1	.	.	.	+	.	+
	<i>Rhinanthus glacialis</i>	E1	+	.	.	.	.	.
	<i>Agrostis alpina</i>	E1	+	.	1	.	.	.
	<i>Sesleria caerulea</i>	E1	1	.	.	+	.	.
	<i>Gentianella anisodonta</i>	E1	.	+	+	.	.	.
	<i>Selaginella selaginoides</i>	E1	1	.	.	.	.	.
	<i>Aster bellidiastrum</i>	E1	.	.	.	.	.	.
	<i>Bartsia alpina</i>	E1	.	.	.	.	+	.
	<i>Gentiana verna</i>	E1	.	.	.	.	+	.
	<i>Alchemilla exigua</i>	E1	.	.	.	.	.	2
	<i>Astragalus penduliflorus</i>	E1	.	.	.	.	.	.
	<i>Acinos alpinus</i> (= <i>Calamintha a.</i> )	E1	.	.	.	.	.	.

8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Pr.	Fr.
.	.	.	+	.	.	.	+	1	.	.	.	.	.	.	.	4	17
.	.	.	.	.	.	.	.	.	.	+	.	1	1	1	.	4	17
.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	3	13
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	4
.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	13
.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	4
.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	5	22
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	3	13
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	3	13
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4
1	2	2	1	.	.	1	+	1	.	.	.	.	.	.	.	14	61
.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	6	26
.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	5	22
.	+	.	+	.	.	.	.	.	+	.	.	.	.	.	.	5	22
.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	4	17
.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	3	13
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4

Number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7
MuA	<b>Mulgedio-Aconitetea</b>							
	<i>Viola biflora</i>	E1	1	+	+	.	1	1
	<i>Geranium sylvaticum</i>	E1	.	.	+	.	.	1
	<i>Peucedanum ostruthium</i>	E1	+	.	.	.	.	.
	<i>Alchemilla xanthochlora</i>	E1	.	.	.	.	.	.
	<i>Veratrum album</i>	E1	.	.	.	.	.	+
	<i>Tephrosia crispa</i>	E1	.	+	.	.	.	1
	<i>Adenostyles alliariae</i>	E1	.	.	.	.	.	1
	<i>Aconitum lycoctonum</i> subsp. <i>ranunculifolium</i>	E1	.	.	.	.	.	+
	<i>Epilobium alpestre</i>	E1	.	.	.	.	.	.
BA	<b>Betulo-Alnetea</b>							
	<i>Alnus alnobetula</i> (= <i>A. viridis</i> )	E2	.	.	.	.	.	.
	<i>Salix waldesteiniana</i>	E1	.	.	.	.	.	.
CD	<b>Caricetalia davallianae</b>							
	<i>Parnassia palustris</i>	E1	+	+	+	.	.	+
MC	<b>Montio-Cardaminetea</b>							
	<i>Saxifraga aizoides</i>	E1	.	+	.	.	.	.
SH	<b>Salicetea herbaceae</b>							
	<i>Sibbaldia procumbens</i>	E1	.	.	.	.	.	.
	<i>Cerastium cerastoides</i>	E1	.	.	.	.	.	.
	<i>Gnaphalium supinum</i>	E1	.	.	.	.	.	.
	<i>Ranunculus aconitifolius</i>	E1	.	.	.	.	.	.
	<i>Salix herbacea</i>	E1	.	.	.	.	.	.
AA	<b>Androsacetalia alpinae</b>							
ac	<i>Sedum alpestre</i>	E1	.	.	.	.	.	.
	<i>Veronica alpina</i>	E1	.	.	.	.	.	.
ac	<i>Cardamine resedifolia</i>	E1	.	.	.	.	.	.
ac	<i>Geum reptans</i>	E1	.	.	.	.	.	.
	<i>Gentiana bavarica</i>	E1	.	.	.	.	.	.
ac	<i>Androsace alpina</i>	E1	.	.	.	.	.	.
ac	<i>Oxyria digina</i>	E1	.	.	.	.	.	.
ac	<i>Ranunculus glacialis</i>	E1	.	.	.	.	.	.
AC	<b>Arabidetalia caeruleae</b>							
	<i>Salix retusa</i>	E1	+	1	+	+	+	.
	<i>Soldanella alpina</i>	E1	1	1	+	.	.	1
	<i>Alchemilla fissa</i>	E1	.	1	1	+	.	.
	<i>Salix reticulata</i>	E1	.	.	1	1	+	.
	<i>Taraxacum</i> sect. <i>Alpina</i>	E1	.	+	+	.	.	.
	<i>Arabis caerulea</i>	E1	.	.	.	.	.	.
	<i>Carex parviflora</i>	E1	.	+	.	.	.	.
	<i>Gnaphalium hoppeanum</i>	E1	.	.	.	.	.	.
	<i>Pritzelago alpina</i> subsp. <i>brevicaulis</i> (= <i>Hutchinsia bre.</i> )	E1	.	.	.	.	.	.
	<i>Saxifraga androsacea</i>	E1	.	.	.	.	.	.
	<i>Soldanella minima</i>	E1	.	.	.	.	.	.
TR	<b>Thlaspietea rotundifolii</b>							
	<i>Festuca nitida</i>	E1	.	+	.	.	.	.
	<i>Cirsium spinosissimum</i>	E1	.	r	.	.	.	.
	<i>Heliosperma alpestre</i>	E1	.	+	.	.	.	.
	<i>Achillea atrata</i>	E1	.	.	.	.	.	+
ac	<i>Epilobium collinum</i>	E1	.	.	.	.	.	.
	<i>Saxifraga oppositifolia</i>	E1	.	.	.	.	.	.



Number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7
AT	<b>Physoplexido-Saxifragion petraeae, Asplenietea trichomanis</b>							
PS	<i>Paederota lutea</i>	E1	.	.	.	.	+	.
PS	<i>Saxifraga tenella</i>	E1	.	.	.	.	+	.
AT	<i>Dianthus sylvestris</i>	E1	.	.	.	.	.	.
KC	<i>Atocion rupestre</i> (= <i>Silene rupestris</i> )	E1	.	.	.	.	.	.
AV	<i>Schlagintweitia intybacea</i> (= <i>Hieracium intybaceum</i> )	E1	.	.	.	.	.	.
QF	<b>Quercio-Fagetea</b>							
	<i>Poa nemoralis</i>	E1	.	.	.	.	.	.
O	<b>Other species (Druge vrste)</b>							
	<i>Alchemilla</i> sp.	E1	+	.	.	2	.	.
	<i>Hieracium picroides</i>	E1	.	.	.	.	.	.
	<i>Agrostis</i> sp.	E1	.	.	.	.	.	.

**Legend – Legenda**

ID	Igor Dakskobler	L	Marlstone – laporovec	AV	<i>Androsacion vandellii</i>
TW	Tone Wraber	G	Claystone – glinavec	Dy	Dystric brown soil – distrična rjava tla
LP	Livio Poldini	R	Chert – roženec	Pr.	Presence (number of relevés in which the species is presented) – število popisov, v katerih se pojavlja vrsta
A	Limestone – apnenec	WS	Sandstone – peščenjek	Fr.	Frequency in % – frekvenca v %
D	Dolomite – dolomit	Re	Rendzina – rendzina		
		ac	acidophilic species – kisloljubna vrsta		
		KC	<i>Koelerio-Corynephoretea</i>		

**Table 2:** Synoptic table of the association *Luzuletum alpinopilosae* s. lat. in the Alps.

**Tabela 2:** Sintezna tabela asociacije *Luzuletum alpinopilosae* s. lat. v Alpah.

Successive number (Zaporedna številka)		1	2	3	4	5
Number of relevés (Število popisov)		15	8	18	10	3
Author of relevés (Avtor popisov)		TWID	LP	PH	CL	BB
SH	<b>Salicetea herbaceae</b>					
	<i>Luzula alpinopilosa</i>	E1	100	100	100	100
	<i>Soldanella pusilla</i>	E1	27	25	72	80
	<i>Sibbaldia procumbens</i>	E1	7	13	.	40
	<i>Gnaphalium supinum</i>	E1	.	25	67	30
	<i>Salix herbacea</i>	E1	.	13	67	80
	<i>Cerastium cerastioides</i>	E1	.	13	.	33
	<i>Ranunculus aconitifolius</i>	E1	.	13	.	.
	<i>Pohlia drumondii</i>	E0	.	.	.	33
	<i>Polytrichastrum sexangulare</i>	E0	.	.	.	33
	<i>Kiaeria starkei</i>	E0	.	.	.	33
AA	<b>Androsacetalia alpinae</b>					
	<i>Veronica alpina</i>	E1	7	13	.	60
	<i>Sedum alpestre</i>	E1	.	38	.	33
	<i>Oxyria digyna</i>	E1	.	13	.	10
	<i>Cardamine resedifolia</i>	E1	.	25	33	.
	<i>Gentiana bavarica</i>	E1	.	13	67	.
	<i>Androsace alpina</i>	E1	.	13	.	.
	<i>Ranunculus glacialis</i>	E1	.	13	.	.
	<i>Epilobium collinum</i>	E1	.	13	.	.
	<i>Geum reptans</i>	E1	.	13	.	.
	<i>Veronica alpina</i>	E1	.	.	61	100



8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Pr.	Fr.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	2	9
.	.	.	.	.	.	.	.	.	.	.	.	+	1	+	.	3	13
.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	4
.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	3	13
.	.	.	.	.	.	.	.	.	.	.	.	2	+	.	.	2	9
.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	1	4

Successive number (Zaporedna številka)		1	2	3	4	5
	<i>Doronicum clusii</i>	E1	.	.	.	100
	<i>Saxifraga seguieri</i>	E1	.	.	.	100
	<i>Saxifraga bryoides</i>	E1	.	.	.	100
	<i>Cerastium uniflorum</i>	E1	.	.	.	33
	<i>Primula latifolia</i>	E1	.	.	.	67
AC	<b><i>Arabidetalia caeruleae</i></b>					
	<i>Trifolium pallescens</i>	E1	60	.	.	.
	<i>Salix retusa</i>	E1	40	13	100	50
	<i>Salix reticulata</i>	E1	27	.	56	.
	<i>Soldanella alpina</i>	E1	27	13	.	30
	<i>Taraxacum</i> sect. <i>Alpina</i>	E1	20	.	.	60
	<i>Alchemilla fissa</i>	E1	20	25	28	.
	<i>Doronicum glaciale</i>	E1	13	50	44	.
	<i>Carex parviflora</i>	E1	7	.	.	60
	<i>Arabis caerulea</i>	E1	.	25	.	20
	<i>Saxifraga androsace</i>	E1	.	13	50	60
	<i>Hutchinsia alpina</i> s. lat.	E1	.	13	50	.
	<i>Soldanella minima</i>	E1	.	13	.	10
	<i>Gnaphalium hoppeanum</i>	E1	.	13	.	.
	<i>Ranunculus alpestris</i>	E1	.	.	50	50
	<i>Taraxacum carinthiacum</i>	E1	.	.	.	60
	<i>Achillea oxyloba</i>	E1	.	.	.	50
	<i>Potentilla brauneana</i>	E1	.	.	.	50
	<i>Gnaphalium hoppeanum</i>	E1	.	.	.	30

Successive number (Zaporedna številka)		1	2	3	4	5
	<i>Alchemilla glaberima</i>	E1	.	.	.	33
TR	<b><i>Thlaspietea rotundifolii</i></b>					
	<i>Rhodiola rosea</i>	E1	53	.	.	.
	<i>Festuca nitida</i>	E1	20	.	.	.
	<i>Cirsium spinosissimum</i>	E1	7	25	50	50
	<i>Achillea atrata</i>	E1	7	.	67	.
	<i>Heliosperma alpestre</i>	E1	7	.	.	.
	<i>Leucanthemum atratum</i> subsp. <i>halleri</i>	E1	.	.	33	.
	<i>Arabis alpina</i>	E1	.	.	22	.
	<i>Thlaspi minimum</i>	E1	.	.	.	20
	<i>Doronicum grandiflorum</i>	E1	.	.	.	10
	<i>Saxifraga sedoides</i>	E1	.	.	.	10
NS	<b><i>Nardion strictae</i></b>					
	<i>Festuca nigrescens</i>	E1	27	38	.	.
	<i>Coeloglossum viride</i>	E1	20	.	.	.
	<i>Agrostis capillaris</i>	E1	7	.	.	.
	<i>Nardus stricta</i>	E1	7	13	33	.
	<i>Gentiana punctata</i>	E1	.	25	.	.
	<i>Campanula barbata</i>	E1	.	13	22	.
	<i>Alchemilla flabellata</i>	E1	.	13	.	.
JT	<b><i>Juncetea trifidi</i></b>					
	<i>Juncus jacquinii</i>	E1	73	25	22	60
	<i>Anthoxanthum nipponicum</i>	E1	67	.	78	20
	<i>Geum montanum</i>	E1	60	75	72	50
	<i>Campanula scheuchzeri</i>	E1	53	13	72	.
	<i>Leontodon helveticus</i>	E1	53	63	61	20
	<i>Potentilla aurea</i>	E1	53	13	50	50
	<i>Helictotrichon versicolor</i>	E1	27	38	11	10
	<i>Juncus trifidus</i>	E1	20	.	17	.
	<i>Agrostis rupestris</i>	E1	13	50	22	.
	<i>Euphrasia minima</i>	E1	13	.	44	.
	<i>Luzula spicata</i>	E1	13	.	.	10
	<i>Carex curvula</i>	E1	7	13	28	.
	<i>Solidago virgaurea</i> subsp. <i>minuta</i>	E1	7	38	.	.
	<i>Botrychium lunaria</i>	E1	7	.	.	.
	<i>Leucanthemopsis alpina</i>	E1	.	75	67	.
	<i>Hieracium alpinum</i>	E1	.	50	6	.
	<i>Oreochloa disticha</i>	E1	.	25	22	.
	<i>Pulsatilla alpina</i> subsp. <i>austriaca</i>	E1	.	25	17	.
	<i>Festuca</i> cfr. <i>pseudodura</i>	E1	.	25	.	.
	<i>Veronica bellidioides</i>	E1	.	25	.	.
	<i>Veronica fruticans</i>	E1	.	25	.	.
	<i>Phyteuma hemisphaericum</i>	E1	.	13	11	20
	<i>Primula minima</i>	E1	.	13	72	.
	<i>Jacobaea carniolica</i> (= <i>Senecio</i> c.)	E1	.	13	.	.
	<i>Phleum alpinum</i>	E1	.	.	61	30
	<i>Poa variegata</i>	E1	.	.	.	10
	<i>Pedicularis kernerii</i>	E1	.	.	.	33
LV	<b><i>Loiseleurio-Vaccinietea</i></b>					
	<i>Vaccinium gaultherioides</i>	E1	13	.	11	.
	<i>Carex pauciflora</i>	E1	.	13	.	.

Successive number (Zaporedna številka)		1	2	3	4	5
	<i>Loiseleuria procumbens</i>	E1	.	.	33	.
OE	<b>Oxytropido-Elynion</b>					
	<i>Carex atrata</i>	E1	33	.	.	10
	<i>Antennaria carpatica</i>	E1	13	13	.	.
	<i>Gentiana nivalis</i>	E1	13	.	.	.
	<i>Lloydia serotina</i>	E1	13	.	.	.
	<i>Arenaria ciliata</i>	E1	7	.	.	.
	<i>Elyna myosuroides</i> ( <i>Carex myosuroides</i> )	E1	.	13	.	.
CA	<b>Caricion austroalpinae</b>					
	<i>Koeleria eriostachya</i>	E1	27	.	.	.
	<i>Festuca calva</i>	E1	7	.	.	.
CF	<b>Caricion ferrugineae</b>					
	<i>Cerastium subtriflorum</i>	E1	20	.	.	.
	<i>Hedysarum hedysaroides</i>	E1	20	.	.	.
	<i>Carex ferruginea</i>	E1	13	.	.	.
	<i>Phleum hirsutum</i>	E1	13	.	.	.
	<i>Gentiana pumila</i>	E1	7	.	.	.
	<i>Trifolium thalii</i>	E1	7	.	.	50
	<i>Festuca violacea</i>	E1	.	.	.	10
Cfir	<b>Caricion firmae</b>					
	<i>Silene acaulis</i>	E1	13	13	78	30
	<i>Dryas octopetala</i>	E1	13	.	6	.
	<i>Minuartia sedoides</i>	E1	7	.	.	.
	<i>Veronica aphylla</i>	E1	7	.	.	.
	<i>Festuca quadriflora</i> ( <i>F. pumila</i> )	E1	.	.	28	.
	<i>Pedicularis rostratocapitata</i>	E1	.	.	6	.
SV	<b>Seslerion coeruleae</b>					
	<i>Galium anisophyllum</i>	E1	47	25	28	.
	<i>Potentilla crantzii</i>	E1	33	.	.	.
	<i>Achillea clavennae</i>	E1	20	13	.	.
	<i>Juncus monanthos</i>	E1	13	.	.	.
	<i>Ranunculus carinthiacus</i>	E1	13	.	.	30
	<i>Festuca violacea</i> agg. ( <i>F. norica</i> ?)	E1	.	.	22	.
	<i>Erigeron neglectus</i>	E1	.	.	.	10
ES	<b>Elyno-Seslerietea</b>					
	<i>Polygonum viviparum</i>	E1	80	25	100	50
	<i>Pedicularis verticillata</i>	E1	47	.	.	.
	<i>Cerastium strictum</i>	E1	33	.	.	.
	<i>Homogyne discolor</i>	E1	33	.	.	.
	<i>Astrantia bavarica</i>	E1	27	.	.	.
	<i>Myosotis alpestris</i>	E1	27	25	50	20
	<i>Thymus praecox</i> subsp. <i>polytrichus</i>	E1	13	38	.	.
	<i>Agrostis alpina</i>	E1	13	13	.	.
	<i>Gentianella anisodonta</i>	E1	13	.	.	.
	<i>Sesleria caerulea</i>	E1	13	.	33	.
	<i>Rhinanthus glacialis</i>	E1	7	13	.	.
	<i>Bartsia alpina</i>	E1	7	.	67	20
	<i>Aster bellidiastrum</i>	E1	7	.	44	.
	<i>Selaginella selaginoides</i>	E1	7	.	33	.
	<i>Gentiana verna</i>	E1	7	.	.	10
	<i>Alchemilla exigua</i>	E1	7	.	.	.

Successive number (Zaporedna številka)		1	2	3	4	5
	<i>Arenaria biflora</i>	E1	.	50	.	.
	<i>Astragalus penduliflorus</i>	E1	.	13	.	.
	<i>Acinos alpinus</i> ( <i>Clinopodium alpinum</i> )	E1	.	13	.	.
	<i>Ligusticum mutellina</i>	E1	.	.	61	100
	<i>Ranunculus montanus</i>	E1	.	.	50	100
	<i>Carex sempervirens</i>	E1	.	.	17	.
CD	<b>Caricetalia davallianae</b>					
	<i>Parnassia palustris</i>	E1	27	.	.	.
MC	<b>Montio-Cardaminetea</b>					
	<i>Saxifraga aizoides</i>	E1	7	13	61	.
	<i>Arabis subcoriacea</i> ( <i>A. soyeri</i> )	E1	.	.	56	.
	<i>Saxifraga stellaris</i>	E1	.	.	33	67
	<i>Alchemilla glabra</i>	E1	.	.	.	20
MuA	<b>Mulgedio-Aconitetea</b>					
	<i>Rumex arifolius</i>	E1	40	25	.	.
	<i>Viola biflora</i>	E1	40	.	.	.
	<i>Geranium sylvaticum</i>	E1	33	.	.	.
	<i>Alchemilla xanthochlora</i>	E1	27	.	.	.
	<i>Peucedanum ostruthium</i>	E1	27	.	.	.
	<i>Veratrum album</i>	E1	27	.	.	.
	<i>Aconitum lycoctonum</i> subsp. <i>ranunculifolium</i>	E1	13	.	.	.
	<i>Adenostyles alliariae</i>	E1	13	.	.	10
	<i>Tephrosieris crispa</i>	E1	13	.	.	.
	<i>Epilobium alpestre</i>	E1	7	.	.	.
BA	<b>Betulo-Alnetea</b>					
	<i>Salix waldsteiniana</i>	E2	7	.	.	.
	<i>Alnus alnobetula</i> (= <i>A. viridis</i> )	E2	.	25	.	.
PaT	<b>Poo alpinae-Trisetetalia</b>					
	<i>Poa alpina</i>	E1	100	50	100	70
	<i>Phleum rhaeticum</i>	E1	53	.	.	.
	<i>Trollius europaeus</i>	E1	40	.	.	.
	<i>Crepis aurea</i>	E1	13	.	.	.
	<i>Euphrasia picta</i>	E1	7	25	.	.
	<i>Trifolium badium</i>	E1	7	13	44	.
MA	<b>Molinio-Arrhenatheretea</b>					
	<i>Leontodon hispidus</i>	E1	60	13	.	10
	<i>Deschampsia cespitosa</i>	E1	13	.	78	.
	<i>Trifolium pratense</i>	E1	7	.	22	.
	<i>Taraxacum</i> sect. <i>Ruderalia</i>	E1	7	.	.	.
	<i>Cerastium fontanum</i>	E1	.	25	.	.
	<i>Veronica serpyllifolia</i>	E1	.	13	.	.
OA	<b>Oxycocco-Sphagnetea</b>					
	<i>Carex pauciflora</i>	E1	.	13	.	.
VP	<b>Vaccinio-Piceetea</b>					
	<i>Homogyne alpina</i>	E1	13	25	67	40
	<i>Rhytidiadelphus triquetrus</i>	E1	13	.	.	.
	<i>Vaccinium myrtillus</i>	E1	7	.	6	.
	<i>Peltigera leucophlebia</i>	E1	7	.	.	.
	<i>Avenella flexuosa</i>	E1	.	50	33	.
	<i>Calamagrostis villosa</i>	E1	.	38	.	.
	<i>Rhododendron ferrugineum</i>	E2	.	13	22	.

Successive number (Zaporedna številka)		1	2	3	4	5	
	<i>Huperzia selago</i>	E1	.	.	33	.	33
	<i>Pleurozium schreberi</i>	E0	.	.	11	.	.
	<i>Luzula sieberi</i>	E1	.	.	.	10	.
	<i>Hyleucomium splendens</i>	E0	.	.	.	.	33
QF	<b>Quercus-Fagetea</b>						
	<i>Poa nemoralis</i>	E1	.	13	.	.	.
PS	<b>Physoplexido-Saxifragion petraeae, Asplenietea trichomanis</b>						
PS	<i>Paederota lutea</i>	E1	7	.	.	.	.
PS	<i>Saxifraga tenella</i>	E1	7	.	.	.	.
KC	<i>Atocion rupestre</i> (= <i>Silene rupestris</i> )	E1	.	38	.	.	.
AT	<i>Dianthus sylvestris</i>	E1	.	25	.	.	.
AV	<i>Schlagintweitia intybacea</i> (= <i>Hieracium intybaceum</i> )	E1	.	13	.	.	.
O	<b>Other species (Druge vrste)</b>						
	<i>Alchemilla</i> sp.	E1	20	.	.	.	.
	<i>Agrostis</i> sp.	E1	7	.	.	.	.
	<i>Hieracium picroides</i>	E1	.	25	.	.	.
	<i>Salix breviserrata</i>	E2	.	.	.	10	.
ML	<b>Mosses and lichens (Mahovi in lišaji)</b>						
	<i>Cladonia pyxidata</i>	E0	.	.	22	.	33
	<i>Solorina crocea</i>	E0	.	.	22	.	33
	<i>Cetraria islandica</i>	E0	.	.	33	.	.
	<i>Polytrichastrum sexangulare</i>	E0	.	.	11	.	.
	<i>Cladonia mitia</i>	E0	.	.	6	.	.
	<i>Cladonia furcata</i>	E0	.	.	6	.	.
	<i>Desmatodon latifolius</i>	E0	.	.	.	.	100
	<i>Bartramia ithyphylla</i>	E0	.	.	.	.	67
	<i>Sciuro-hypnum reflexum</i>	E0	.	.	.	.	67
	<i>Nardia scalaris</i>	E0	.	.	.	.	67
	<i>Nardia geoscyphus</i>	E0	.	.	.	.	67
	<i>Anthelia julacea</i>	E0	.	.	.	.	67
	<i>Blepharostoma trichophyllum</i>	E0	.	.	.	.	67
	<i>Lephozia ventricosa</i>	E0	.	.	.	.	67
	<i>Sanionia uncinata</i>	E0	.	.	.	.	67
	<i>Polytrichum juniperinum</i>	E0	.	.	.	.	33
	<i>Polytrichum piliferum</i>	E0	.	.	.	.	33
	<i>Ditrichum flexicaule</i>	E0	.	.	.	.	33
	<i>Plagiochila asplenioides</i>	E0	.	.	.	.	33
	<i>Brachythecium albicans</i>	E0	.	.	.	.	33
	<i>Brachythecium glareosum</i>	E0	.	.	.	.	33
	<i>Gymnomitrium varians</i>	E0	.	.	.	.	33
	<i>Racomitrium canescens</i>	E0	.	.	.	.	33
	<i>Peltigera aptosa</i>	E0	.	.	.	.	33

**Legend – Legenda**

- |   |  |    |   |
|---|--|----|---|
| 1 | <i>Junco jacquinii-Luzuletum alpinopilosae</i> , Julian Alps, Slovenia, I. Dakskobler, T. Wraber, this article | 4  | <i>Taraxaco carinthiaci-Luzuletum alpinopilosae</i> , Dolomites, Feltre, Lasen (1982)       |
| 2 | <i>Junco jacquini-Luzuletum alpinopilosae</i> , Carnic Alps, L. Poldini, this article                          | 5  | <i>Luzuletum spadiceae</i> , Central Alps, Braun-Blanquet in Braun-Blanquet et Jenny (1926) |
| 3 | <i>Luzuletum alpinopilosae salicetosum retusae</i> , Tappenkars, Austra, Heiselmayer (1982)                    | KC | <i>Koelerio-Corynephoretea</i>  |
|   |  | AV | <i>Androsacion vandellii</i>  |

**Table 3:** Groups of diagnostic species in the communities with dominant *Luzula alpinopilosa* in the Alps (relative frequencies).

**Tabela 3:** Skupine diagnostičnih vrst v združbah s prevladujočo vrsto *Luzula alpinopilosa* v Alpah (relativne frekvence).

Successive number (Zaporedna številka)	1	2	3	4	5
Number of relevés (Število popisov)	15	8	18	10	3
Author of relevés (Avtor popisov)	TWID	LP	PH	CL	BB
<i>Salicetum herbaceae</i>	<b>5.69</b>	<b>10.0</b>	<b>9.75</b>	<b>19.3</b>	<b>13.7</b>
<i>Androsacetalia alpinae</i>	0.3	<b>7.65</b>	<b>5.13</b>	4.09	<b>15.7</b>
<i>Arabidetalia caeruleae</i>	<b>8.66</b>	<b>8.84</b>	<b>12.0</b>	<b>31.0</b>	3.92
<i>Thlaspietea rotundifolii</i>	3.98	1.24	<b>5.48</b>	<b>5.26</b>	0
<i>Nardion strictae</i>	2.56	<b>5.07</b>	1.75	0	0
<i>Juncetea trifidi</i>	<b>19.9</b>	<b>30.7</b>	23.4	<b>16.4</b>	<b>18.6</b>
<i>Loiseleurio-Vaccinietea</i>	0.57	0.65	1.4	0	0
<i>Vaccinio-Piceetea</i>	1.71	<b>6.26</b>	<b>5.48</b>	2.92	1.94
<i>Oxycocco-Sphagneteta</i>	0	0.65	0	0	0
<i>Oxytropido-Elynon</i>	3.41	1.29	0	0.58	0
<i>Caricion austroalpinae</i>	1.41	0	0	0	0
<i>Caricion ferrugineae</i>	3.41	0	0	3.51	0.97
<i>Caricion firmae</i>	1.71	0.65	3.76	1.75	0.97
<i>Seslerion coeruleae</i>	<b>5.41</b>	1.89	1.59	2.34	0
<i>Elyno-Seslerietea</i>	<b>14.5</b>	<b>9.44</b>	<b>14.5</b>	5.85	<b>10.8</b>
<i>Caricetalia davallianae</i>	1.15	0	0	0	0
<i>Montio-Cardaminetea</i>	0.28	0.65	4.78	1.17	1.97
<i>Mulgedio-Aconitetea, Betulo-Alnetea</i>	<b>10.5</b>	2.48	0	0.58	0.97
<i>Poo alpinae-Trisetetalia</i>	<b>9.38</b>	4.37	4.59	4.09	0.97
<i>Molinio-Arrhenatheretea</i>	3.7	2.53	3.19	0.58	0
<i>Quercu-Fagetea</i>	0	0.65	0	0	0
<i>Physoplexido-Saxifragion petraeae, Aspleneteta trichomanis</i>	0.55	3.78	0	0	0
Other species (Druge vrste)	1.14	1.24	0	0.58	0
Mosses and lichens (Mahovi in lišaji)	0	0	3.19	0	<b>29.4</b>
Total (Skupaj)	100.0	100.0	100.0	100.0	100.0

#### Legend – Legenda

- 1 *Junco jacquinii-Luzuletum alpinopilosae*, Julian Alps, Slovenia, I. Dakskobler, T. Wraber, this article
- 2 *Junco jacquini-Luzuletum alpinopilosae*, Carnic Alps, L. Poldini, this article
- 3 *Luzuletum alpinopilosae salicetosum retusae*, Tappenkars, Austra, Heiselmayer (1982)
- 4 *Taraxaco carinthiaci-Luzuletum alpinopilosae*, Dolomites, Feltre, Lasen (1982)
- 5 *Luzuletum spadiceae*, Central Alps, Braun-Blanquet in Braun-Blanquet et Jenny (1926)